Xiaoyu **Wang**

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Professional Experience

Sept 2022- Current	**Post-Doctoral Fellow** in Department of Mathematics, **The Hong Kong University of Science and Technology**, Hong Kong Supervisor : Prof. Tong Zhang
2020- Sept Aug 2022	**Post-Doctoral Researcher** in Decision and Control Systems, **KTH - Royal Institute of Technology** , Stockholm, Sweden Supervisor : Prof. Mikael Johansson

Education

Sept 2015- July 2020	**Ph.D.** in computational mathematics, **University of Chinese Academy of Sciences** , Beijing, China & Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, China **Defense thesis** : Algorithms and Their Theories for Stochastic Optimization Supervisor : Prof. Ya-xiang Yuan
Sept 2011- June 2015	**B.S.** in mathematics, School of Mathematics and Statistics, **Wuhan University** , Wuhan, China **Defense thesis** : The Analysis of Global Minima Reduction Property with Low Rank Constraint Supervisor : Prof. Zhongping Wan

Research Interests

- ♡ Stochastic First-Order Optimization Algorithms for Machine Learning
- ♡ Stochastic Second-order (Newton, Quasi-Newton, Trust-Region) Optimization
- ♡ Nonconvex and Nonsmooth Structured Optimization
- ♡ Learning Rate Policy in Stochastic Optimization

My research involves optimization algorithms and their applications in large-scale machine learning. Besides the listed topics, currently, I am interested in min-max optimization problems and bilevel optimization.

Publications

1. **Xiaoyu Wang**, Xiao Wang, Ya-xiang Yuan. Stochastic proximal quasi-Newton methods for non-convex composite optimization. Optimization Methods and Software, 34:5, 922-948, 2019.
2. **Xiaoyu Wang**, Ya-xiang Yuan. Stochastic trust-region methods with trust-region radius depending on probabilistic models. Journal of Computational Mathematics, 2022, 40(2) : 294-334. DOI : 10.4208/jcm.2012-m2020-0144.
3. **Xiaoyu Wang**, Ya-xiang Yuan. On the convergence of stochastic gradient descent with bandwidth-based step size. (accepted after minor revision by Journal of Machine Learning Research)
4. **Xiaoyu Wang**, Sindri Magnússon, and Mikael Johansson. On the convergence of step decay step-size for stochastic optimization. 35th Conference on Neural Information Processing Systems (NeurIPS 2021), 2021.
5. **Xiaoyu Wang** and Mikael Johansson. Bandwidth-based step sizes for non-convex stochastic optimization, arXiv:2106.02888, 2021 (under review).
6. Sarit Khirirat, **Xiaoyu Wang**, Sindri Magnússon, Mikael Johansson. Improved step-size schedules for noisy gradient methods. ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021.
7. Erik Berglund, Sarit Khirirat, **Xiaoyu Wang**. Zeroth-order random subspace Newton method. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022.
8. **Xiaoyu Wang**, Mikael Johansson. On Uniform Boundedness Properties of SGD and its Momentum Variants. arXiv:2201.10245, 2022.

Skills

Programming Languages	Python, C, Matlab, LaTex
Machine Learning	PyTorch, TensorFlow
High Performance Computing	Linux, Shell
Parallel/Distributed Computing	OpenMP, MPI

Honors and Awards

2020 Excellent President Award of Chinese Academy of Sciences (< 3 %)

2019 Excellent President Scholarship of Academy of Mathematics and Systems Science, Chinese Academy of Sciences (< 5 %)

2018 Special Award of Aramco Scholarship of Academy of Mathematics and Systems Science, Chinese Academy of Sciences (< 15 %)

2015 Outstanding Freshman Scholarship of Academy of Mathematics and Systems Science, Chinese Academy of Sciences (< 10 %)

2013 National Encouragement Scholarship of Wuhan University

Selected Presentations

2021.07 SIAM Conference on Optimization (OP21)
Oral talk : "Stochastic Gradient Descent Method with Bandwidth-Based Step Size"

2019.09 The 17th Annual Meeting of Chinese Society for Industrial and Applied Mathematics (CSIAM 2019), Foshan, China
Oral talk : "Stochastic Trust Region Methods with Trust Region Radius Depending on Probabilistic Models"

2019.08 The Sixth International Conference on Continuous Optimization (ICCOPT 2019), Berlin, Germany
Oral talk : "Stochastic Trust Region Methods with Trust Region Radius Depending on Probabilistic Models"

2019.04 The 12th International Conference on Numerical Optimization and Numerical Linear Algebra (ICNONLA2019), Shangrao, China
Oral talk : "Stochastic Trust Region Methods with Trust Region Radius Depending on Probabilistic Models"

2018.08 2018 Workshop on New Computing-Driven Opportunities for Optimization, Wuyi Shan, China
Poster (In English) : "Stochastic Trust Region Methods with Trust Region Radius Depending on Probabilistic Models"

2017.07 The 11th International Conference on Numerical Optimization and Numerical Linear Algebra (ICNONLA 2017), Yinchuan, China
Oral talk (In English) : "Stochastic proximal quasi-Newton methods for non-convex composite optimization"

Academic Volunteer Experience

Reviewer for Conferences and Journals

Conference on Neural Information Processing Systems(NeurIPS, 2021) ; ICML 2022

Journals on "Journal of Machine Learning Research", "Optimization Methods and Software" and "Science China Mathematics"

The Chinese Academy of Sciences (CAS) SIAM Student Chapter 2017 – 2018

I have been selected as the president of CAS SIAM Student Chapter and have led the executive committee members to organize some regular academic lectures and held "The 6th CAS SIAM Student Chapter Annual Meeting" on June 2018, at Beijing, China.

International Conference (Organization) Volunteers 2016–2019

On April 8-13, 2019, I have been the core volunteer of The 3rd Academic Activity of Silkroad Mathematics Center", at Beijing, China.

On April 15-18, 2019, I have been a secretary of the conference ICNONLA 2019, at Shangrao, China.

On Jan 5-6, 2018, I have been the core volunteer of "AMSS-PolyU Joint Workshop on Applied Mathematics", at Beijing, China.

Teaching and Mentoring

The Mentoring Experience at KTH 2020 - 2021

I have been involved in the Convex Optimization Course (Oct 2020 - Dec 2020) and taken the responsibility for assignment, correction, and discussion; In addition, I have been a teaching assistant for the Ph.D. level course on Distributed Optimization (June 2021 - Sept 2021).
I mentored the Ph.D. students Erik Berglund and Sarit Khirirat, and have a joint publication.

References

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